Final

Site Investigation Report
Range, Choccolocco Corridor, Parcel 143Q

Fort McClellan
Calhoun County, Alabama

Prepared for:

U.S. Army Corps of Engineers, Mobile District
109 St. Joseph Street
Mobile, Alabama 36602

Prepared by:

Shaw Environmental, Inc.
312 Directors Drive
Knoxville, Tennessee 37923

Task Order CK10
Contract No. DACA21-96-D-0018
Shaw Project No. 796887

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Executive Summary

In accordance with Contract Number DACA21-96-D-0018, Task Order CK10, Shaw Environmental, Inc. completed a site investigation (SI) at the Range, Choccolocco Corridor, Parcel 143Q, at Fort McClellan in Calhoun County, Alabama. The SI was conducted to determine whether chemical constituents are present at the site as a result of historical mission-related Army activities. The SI consisted of the collection and analysis of 11 surface soil samples, 8 subsurface soil samples, and 2 groundwater samples. In addition, two permanent residuum monitoring wells were installed in the saturated zone to facilitate groundwater sample collection and to provide site-specific geological and hydrogeological characterization information.

Chemical analysis of samples collected at the site indicates that metals, volatile organic compounds, semivolatile organic compounds, and pesticides were detected in site media. Herbicides and explosive compounds were not detected in site media. To evaluate whether the detected constituents pose an unacceptable risk to human health or the environment, the analytical results were compared to human health site-specific screening levels, ecological screening values (ESV), and background screening values for Fort McClellan. Site metals data were also evaluated using statistical and geochemical methods to determine if the metals were site related.

Constituents detected at concentrations exceeding SSSLs and background (where available) were identified as chemicals of potential concern (COPC) in site media. COPCs included two metals (aluminum and manganese) and two polynuclear aromatic hydrocarbon (PAH) compounds (benzo[a]pyrene and benzo[k]fluoranthene) in surface soil, and five metals (aluminum, chromium, iron, manganese, and vanadium) in subsurface soil. No COPCs were identified in groundwater. The statistical and geochemical evaluation determined that the metals detected in site media were naturally occurring. The PAHs were detected at low levels in one sample collected from a mound containing partially buried railroad ties. The railroad ties were most likely treated with coal-tar creosote, a wood preservative, that is composed predominantly of PAH compounds. Therefore, the PAHs represent localized, low-level contamination directly related to the railroad ties, rather than a widespread release to the environment.

Constituents detected at concentrations exceeding ESVs and background (where available) were identified as constituents of potential ecological concern (COPEC) in surface soil. COPECs

included six metals (aluminum, beryllium, manganese, mercury, selenium, and zinc), four PAH compounds (anthracene, benzo[a]pyrene, fluoranthene, and pyrene), and three pesticides (beta-hexachlorocyclohexane, endrin, and methoxychlor). The metals detected in site media were all determined to be naturally occurring. The PAHs reflect localized, low-level contamination attributable to the presence of railroad ties located within a mound at the site. The pesticides were detected at levels within the same order of magnitude as their respective ESVs; two of the pesticides were detected at estimated levels. Given the conservatism of the ESVs and the relatively small magnitude of the exceedances, it is concluded that the levels of pesticides detected in surface soil do not pose an unacceptable risk to ecological receptors.

Based on the results of the SI, past operations at Parcel 143Q have not adversely impacted the environment. The metals and chemical compounds detected in site media do not pose an unacceptable risk to human health or the environment. Therefore, Shaw Environmental, Inc. recommends "No Further Action" and unrestricted land reuse with regard to Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)-related hazardous substances at the Range, Choccolocco Corridor, Parcel 143Q.

1.0 Introduction

The U.S. Army has selected Fort McClellan (FTMC), located in Calhoun County, Alabama, for closure by the Base Realignment and Closure (BRAC) Commission under Public Laws 100-526 and 101-510. The 1990 Base Closure Act, Public Law 101-510, established the process by which U.S. Department of Defense (DOD) installations would be closed or realigned. The BRAC Environmental Restoration Program requires investigation and cleanup of federal properties prior to transfer to the public domain. The U.S. Army is conducting environmental studies of the impact of suspected contaminants at parcels at FTMC under the management of the U.S. Army Corps of Engineers (USACE)-Mobile District. The USACE contracted Shaw Environmental, Inc. (Shaw) (formerly IT Corporation [IT]) to perform the site investigation (SI) at Range, Choccolocco Corridor, Parcel 143Q, under Contract Number DACA21-96-D-0018, Task Order CK10.

This report presents specific information and results compiled from the SI, including field sampling and analysis and monitoring well installation activities conducted at Parcel 143Q.

1.1 Project Description

Parcel 143Q was identified as an area to be investigated prior to property transfer. The site was classified as a Category 1 Qualified parcel in the *Final Environmental Baseline Survey, Fort McClellan, Alabama* (EBS) (Environmental Science and Engineering, Inc. [ESE], 1998). Category 1 Qualified parcels are areas that have no evidence of storage, release, or disposal of petroleum or hazardous substances regulated by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) but that do have other environmental or safety concerns. Parcel 143Q was qualified because chemicals of potential concern may be present as a result of historical range activities.

A site-specific work plan, comprised of a field sampling plan (SFSP), a safety and health plan, and an unexploded ordnance (UXO) safety plan, was finalized in April 2002 (IT, 2002a). The work plan was prepared to provide technical guidance for SI field activities at Parcel 143Q. The site-specific work plan was used as an attachment to the installation-wide work plan (IT, 1998) and the installation-wide sampling and analysis plan (SAP) (IT, 2000a; IT, 2002b). The SAP includes the installation-wide safety and health plan and quality assurance plan.

The SI included fieldwork to collect 11 surface soil samples, 8 subsurface soil samples, and 2 groundwater samples to determine whether potential site-specific chemicals are present at the site.

1.2 Purpose and Objectives

The SI program was designed to collect data from site media and provide a level of defensible data and information in sufficient detail to determine whether chemical constituents are present at Parcel 143Q at concentrations that pose an unacceptable risk to human health or the environment. The conclusions of the SI in Chapter 6.0 are based on the comparison of the analytical results to human health site-specific screening levels (SSSL), ecological screening values (ESV), and background screening values for FTMC. The SSSLs and ESVs were developed by Shaw as part of the human health and ecological risk evaluations associated with SIs being performed under the BRAC Environmental Restoration Program at FTMC. The SSSLs and ESVs are presented in the *Final Human Health and Ecological Screening Values and PAH Background Summary Report* (IT, 2000b). Background metals screening values are presented in the *Final Background Metals Survey Report, Fort McClellan, Alabama* (Science Applications International Corporation, 1998). Site metals data were also evaluated using statistical and geochemical methods to determine if the metals were site related (Shaw, 2003).

Based on the conclusions presented in this SI report, the BRAC Cleanup Team will decide either to propose "No Further Action" or to conduct additional work at the site.

1.3 Site Description and History

Range, Choccolocco Corridor, Parcel 143Q is located in the northwestern portion of Choccolocco Corridor, east of the FTMC Main Post (Figure 1-1). Parcel 143Q was originally identified by the U.S. Environmental Protection Agency (EPA) Environmental Photographic Interpretation Center (EPIC) (EPA, 1990). This area appears to be active in EPIC aerial photograph composites dated 1937, 1949, 1954, and 1972. Choccolocco Corridor was leased from the State of Alabama from 1941 to 1998 for military training activities. Thus, land use observed on aerial photographs prior to 1941 was not related to Army activities. Based on interviews conducted during the EBS and due to the absence of cratered impact areas, Parcel 143Q is presumed to have been a small-arms range (ESE, 1998). Parcel 143Q is located north-northeast of the Range 40 Complex (Parcels 94Q, 95Q, 96Q, and 97Q); however, no impact areas or range fans extend into this parcel. The orientation of Parcel 143Q suggests that the direction of fire was to the north.

LEGEND

- UNIMPROVED ROADS
- TREES / TREELINE
- PARCEL BOUNDARY
- SURFACE DRAINAGE / CREEK

FIGURE 1-1
SITE LOCATION MAP
RANGE, CHOCCOLOCCO CORRIDOR
PARCEL 143Q

U. S. ARMY CORPS OF ENGINEERS
MOBILE DISTRICT
FORT McCLELLAN
CALHOUN COUNTY, ALABAMA
Contract No. DACA21-96-D-0018

Shaw Environmental, Inc.

DRAFT. CHCK. BY:
ENGR. CHCK. BY: S. MORAN
INITIATOR: T. WINTON
PROJ. MGR.: J. YACOUB
DWG. NO.: ...\796887es.663
PROJ. NO.: 796887

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DRAWN BY:
STARTING DATE: 01/08/03
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A site walk was conducted by Shaw in October 2001. A large north-south trending mound was observed in the central portion of the parcel (Figure 1-2). The mound was approximately 100 feet long and had partially buried railroad cross ties near its center. A second mound, approximately 75 feet long, was also observed in the central portion of the parcel. Three possible foxholes were observed at the base of a hill in the southern area of the parcel. During an additional site walk in January 2002, shell casings from blank ammunition were identified on an unimproved road bisecting the central portion of the parcel.

1.3.1 Archives Search Report Ranges

Parcel 143Q is not shown on Range Plates 1 through 10 from the *Archives Search Report, Maps, Fort McClellan, Anniston, Alabama* (ASR) (USACE, 2001a). However, Photo Plate 4 (1954), Photo Plate 5 (1961), and Photo Plate 6 (1969) from the ASR show dirt roads and clearings in and near the parcel. Features appearing in the 1961 aerial photograph include a well-defined dirt road and three barren areas. Also evident in the 1961 photograph are narrow parallel barren areas oriented northwest to southeast, indicating possible shooting lanes or trenching.

1.3.2 Aerial Photographs

Available aerial photographs from FTMC were reviewed to reveal any land-use activity at Parcel 143Q, as discussed in the following paragraphs.

1937 and 1940. The 1937 and 1940 aerial photographs show a majority of Parcel 143Q was cleared and presumably used for farming (cultivation). This cleared area essentially approximates the shape of Parcel 143Q. Well-defined roads are not evident in the 1937 and 1940 aerial photographs.

1954. The 1954 aerial photograph (Figure 1-3) indicates that cultivation in the area of Parcel 143Q has ceased. Evidence of activity is seen in the northern area of the parcel with the presence of a cleared area and dirt roads. The remainder of the area does not appear to be actively used.

1969. The 1969 aerial photograph (Figure 1-4) shows continued activity to the northwest of the parcel, as evidenced by cleared areas and widened dirt roads. The remainder of the area shows an increase in tree cover.

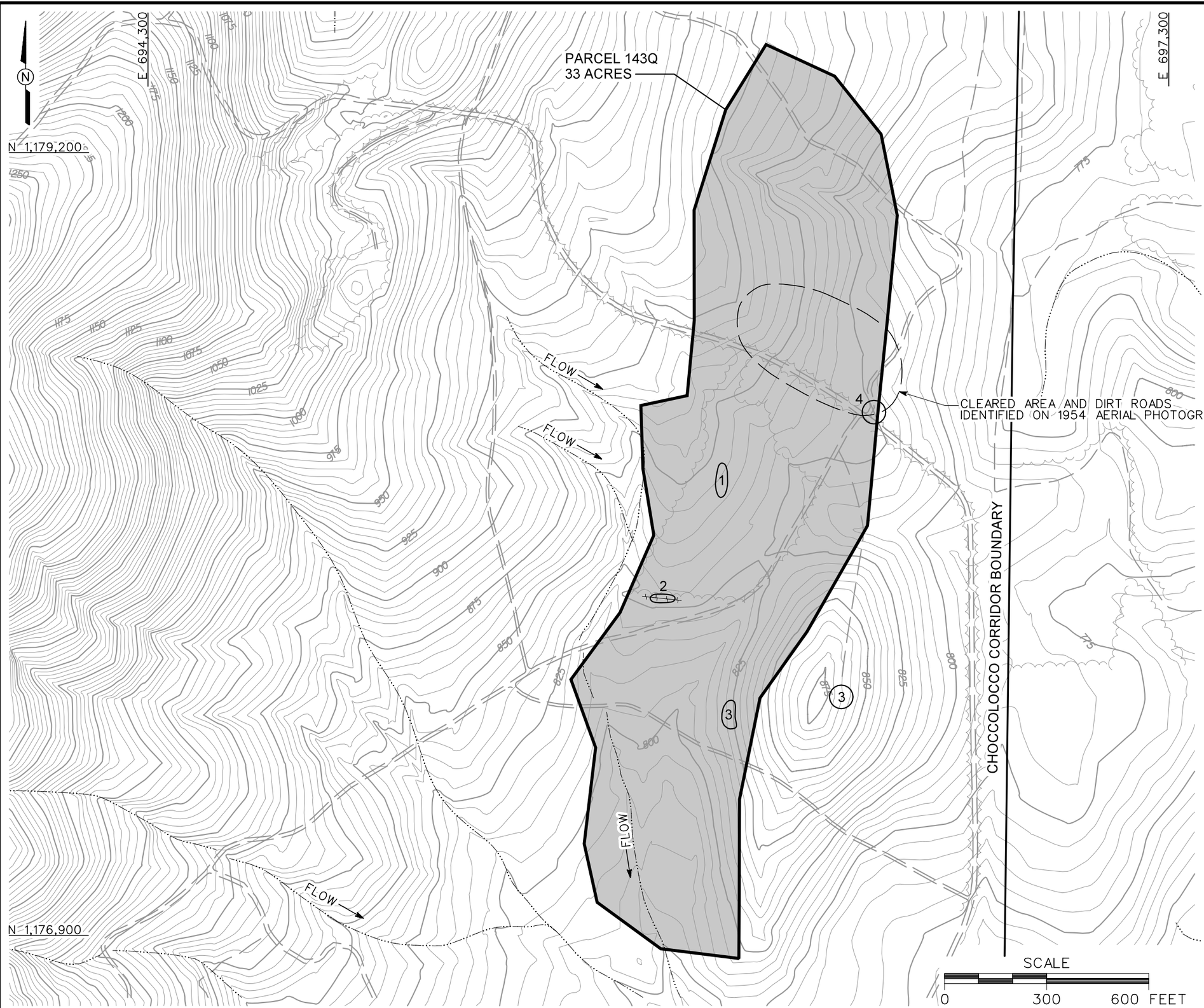

FIGURE 1-2
SITE MAP
RANGE, CHOCCOLOCCO CORRIDOR
PARCEL 143Q

U. S. ARMY CORPS OF ENGINEERS
MOBILE DISTRICT
FORT McCLELLAN
CALHOUN COUNTY, ALABAMA
Contract No. DACA21-96-D-0018

Shaw™ Shaw Environmental, Inc.

DWG. NO.: ...796887es.664 | PROJ. NO.: 796887
INITIATOR: T. WINTON | PROJ. MGR.: J. YACOUB
DRAFT. CHCK. BY: | ENGR. CHCK. BY: S. MORAN
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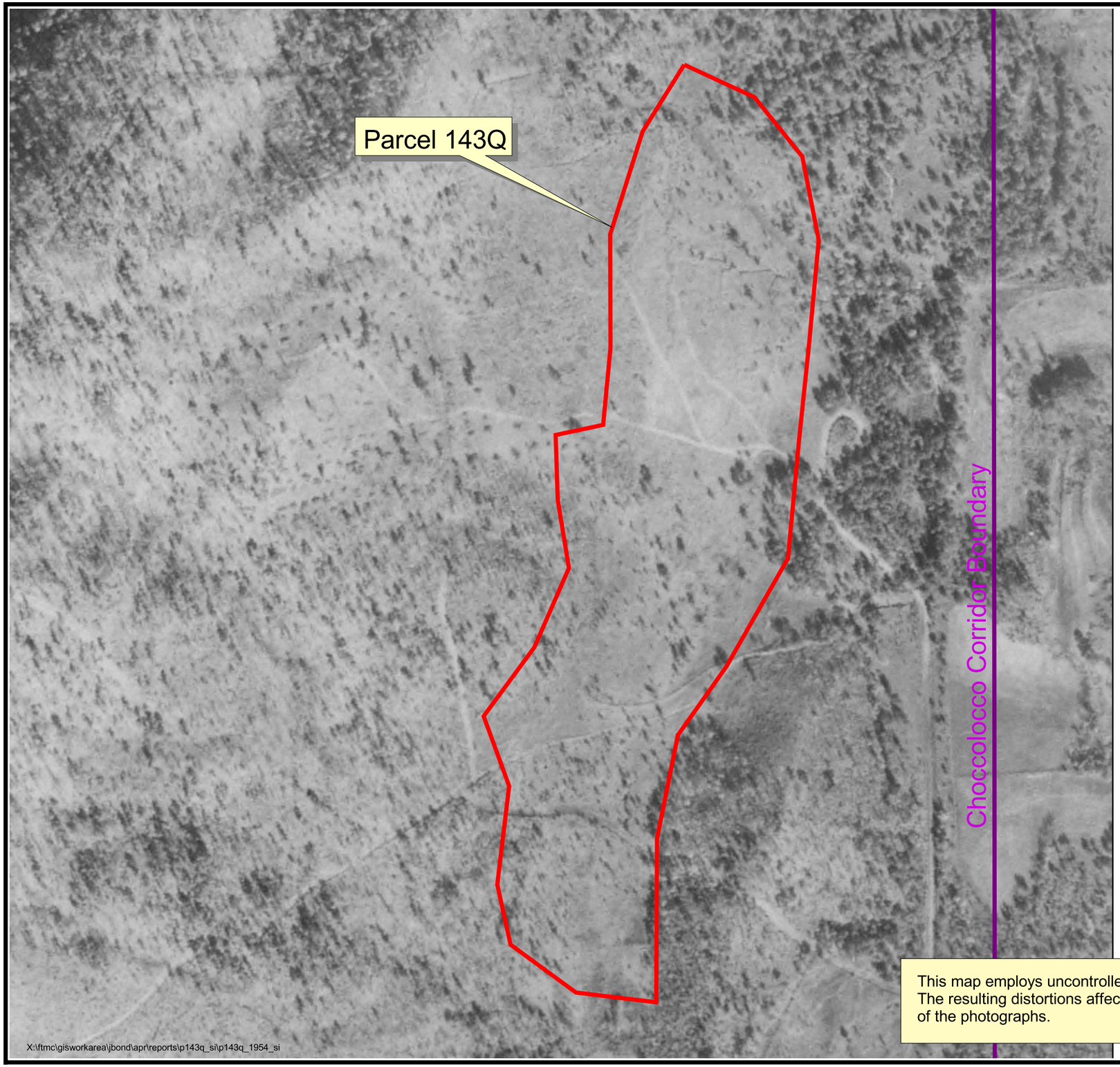

1954 aerial coverage unavailable for this area

This map employs uncontrolled aerial photographs. The resulting distortions affect the spatial accuracy of the photographs.

X:\ftmc\gisworkarea\jbond\apr\reports\p143q_si\p143q_1954_si

Figure 1-3

1954 Aerial Photograph

Range, Choccolocco Corridor,
Parcel 143Q
Fort McClellan, Alabama

Legend

- Parcel Boundary
- Choccolocco Corridor Boundary

300 0 300 Feet

NAD83 State Plane Coordinates

N

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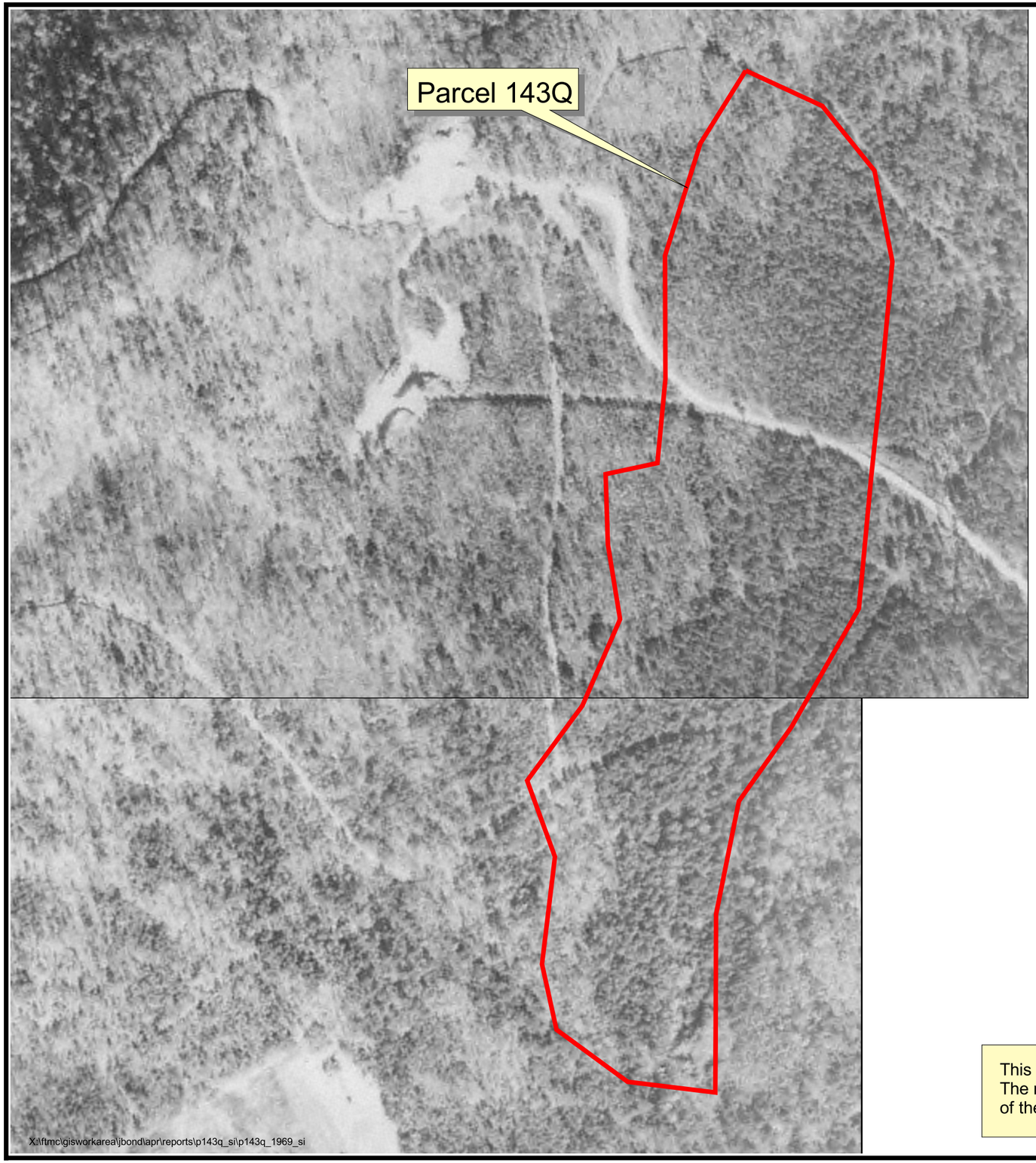

Choccolocco Corridor Boundary

1969 aerial coverage unavailable for this area

This map employs uncontrolled aerial photographs. The resulting distortions affect the spatial accuracy of the photographs.

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Figure 1-4

1969 Aerial Photograph

Range, Choccolocco Corridor,
Parcel 143Q
Fort McClellan, Alabama

Legend

- Parcel Boundary
- Choccolocco Corridor Boundary

300 0 300 Feet

NAD83 State Plane Coordinates

N

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1976, 1982, 1994, and 1998. These aerial photographs are very similar to the 1969 photograph illustrating the increase in tree cover. In the 1994 photograph, an area of several acres has been cleared in the east-central portion of the parcel. The clearing is associated with forestry activity and not related to military activities. The cleared area is also apparent in the 1998 aerial photograph (Figure 1-5).

Figure 1-5

1998 Aerial Photograph

Range, Choccolocco Corridor,
Parcel 143Q
Fort McClellan, Alabama

Legend

- Parcel Boundary
- Choccolocco Corridor Boundary

300 0 300 Feet

NAD83 State Plane Coordinates

N

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Mobile District

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2.0 Previous Investigations

An EBS was conducted by ESE to document current environmental conditions of all FTMC property (ESE, 1998). The purpose of the study was to identify sites that, based on available information, have no history of contamination and comply with DOD guidance for fast-track cleanup at closing installations. The EBS also provides a baseline picture of FTMC properties by identifying and categorizing the properties by seven criteria:

1. Areas where no storage, release, or disposal of hazardous substances or petroleum products has occurred (including no migration of these substances from adjacent areas).

2. Areas where only release or disposal of petroleum products has occurred.

3. Areas where release, disposal, and/or migration of hazardous substances has occurred, but at concentrations that do not require a removal or remedial response.

4. Areas where release, disposal, and/or migration of hazardous substances has occurred, and all removal or remedial actions to protect human health and the environment have been taken.

5. Areas where release, disposal, and/or migration of hazardous substances has occurred, and removal or remedial actions are underway, but all required remedial actions have not yet been taken.

6. Areas where release, disposal, and/or migration of hazardous substances has occurred, but required actions have not yet been implemented.

7. Areas that are not evaluated or require additional evaluation.

For non-CERCLA environmental or safety issues, the parcel label includes the following components: a unique non-CERCLA issue number; the letter "Q" designating the parcel as a Community Environmental Response Facilitation Act (CERFA) Category 1 Qualified parcel; and the code of the specific non-CERCLA issue(s) present (ESE, 1998). The non-CERCLA issue codes used are:

- A = Asbestos (in buildings)
- L = Lead-based paint (in buildings)
- P = Polychlorinated biphenyls
- R = Radon (in buildings)
- RD = Radionuclides/radiological issues

- X = UXO
- CWM = Chemical warfare material.

The EBS was conducted in accordance with CERFA protocols (Public Law 102-426) and DOD policy regarding contamination assessment. Record searches and reviews were performed on all reasonably available documents from FTMC, the Alabama Department of Environmental Management (ADEM), EPA Region 4, and Calhoun County, as well as a database search of CERCLA-regulated substances, petroleum products, and Resource Conservation and Recovery Act-regulated facilities. Available historical maps and aerial photographs were reviewed to document historical land uses. Personal and telephone interviews of past and present FTMC employees and military personnel were conducted. In addition, visual site inspections were conducted to verify conditions of specific property parcels.

Parcel 143Q is an area where no known or recorded storage, release, or disposal (including migration) of hazardous substances or petroleum products has occurred on site property. The parcel, however, was qualified because chemicals of potential concern may be present as a result of historical range activities. Therefore, this parcel required additional evaluation to determine its environmental condition.

3.0 Current Site Investigation Activities

This chapter summarizes SI activities conducted by Shaw at Range, Choccolocco Corridor, Parcel 143Q, including UXO avoidance activities, environmental sampling and analysis, and groundwater monitoring well installation activities.

3.1 UXO Avoidance

UXO avoidance was performed at Parcel 143Q following methodology outlined in the SAP. Shaw UXO personnel used a low-sensitivity magnetometer to perform a surface sweep of the parcel prior to site access. After the site was cleared for access, sample locations were monitored by UXO personnel following procedures outlined in the SAP.

3.2 Environmental Sampling

Environmental sampling performed during the SI at Parcel 143Q included the collection of surface soil samples, subsurface soil samples, and groundwater samples for chemical analysis. Sample locations were determined by observing site physical characteristics during a site walk and by reviewing historical documents and aerial photographs pertaining to activities conducted at the site. The sample locations, media, and rationale are summarized in Table 3-1. Sampling locations are shown on Figure 3-1. Samples were submitted for laboratory analysis of site-related parameters listed in Section 3.4.

3.2.1 Surface Soil Sampling

Surface soil samples were collected from 11 locations at Parcel 143Q, as shown on Figure 3-1. Soil sampling locations and rationale are presented in Table 3-1. Sample designations and analytical parameters are listed in Table 3-2. Sampling locations were determined in the field by the on-site geologist based on UXO avoidance activities, sampling rationale, presence of surface structures, and site topography.

Sample Collection. Surface soil samples were collected from the uppermost foot of soil using a stainless-steel hand auger, following the methodology specified in the SAP. Surface soil samples were collected by first removing surface debris (e.g., rocks and vegetation) from the immediate sample area. The soil sample was then collected with the sampling device and was screened with a photoionization detector (PID) in accordance with procedures outlined in the SAP. As necessary, the soil fraction for volatile organic compound (VOC) analysis was collected directly from the sample device using three EnCore® samplers. The remaining soil was

Table 3-1

Sampling Locations and Rationale
Range, Choccolocco Corridor, Parcel 143Q
Fort McClellan, Calhoun County, Alabama

Sample Location	Sample Media	Sample Location Rationale
HR-143Q-GP01	Surface soil and subsurface soil	Surface and subsurface soil samples were collected in the northern portion of the parcel, approximately 300 feet north of the cleared area identified on aerial photographs, to determine if potential site-specific chemicals have impacted site media.
HR-143Q-GP02	Surface soil and subsurface soil	Surface and subsurface soil samples were collected approximately 70 feet northwest of the cleared area identified on aerial photographs to determine if potential site-specific chemicals have impacted site media.
HR-143Q-GP03	Surface soil and subsurface soil	Surface and subsurface soil samples were collected near the center of the cleared area identified on aerial photographs to determine if potential site-specific chemicals have impacted site media.
HR-143Q-GP04	Surface soil	A surface soil sample was collected from the mound with half-buried cross ties to determine if potential site-specific chemicals have impacted site media.
HR-143Q-GP05	Surface soil	A surface soil sample was collected from a mound identified during the site visit to determine if potential site-specific chemicals have impacted site media.
HR-143Q-GP06	Surface soil	A surface soil sample was collected from a berm identified during the site visit to determine if potential site-specific chemicals have impacted site media.
HR-143Q-GP07	Surface soil and subsurface soil	Surface and subsurface soil samples were collected on the western side (downslope) of possible foxholes in the southern portion of the parcel to determine if site-specific chemicals have impacted site media.
HR-143Q-GP08	Surface soil and subsurface soil	Surface and subsurface soil samples were collected in the southern portion of the parcel to determine if site-specific chemicals have impacted site media.
HR-143Q-GP09	Surface soil and subsurface soil	Surface and subsurface soil samples were collected in the vicinity of bullet casings in the eastern-central portion of the parcel to determine if site-specific chemicals have impacted site media.
HR-143Q-MW01	Surface soil, subsurface soil, and groundwater	Surface soil, subsurface soil, and groundwater samples were collected downslope of the logged areas and loop road to determine if potential site-specific chemicals have impacted site media. A residuum monitoring well was also installed to determine local groundwater flow direction and location-specific geology.
HR-143Q-MW02	Surface soil, subsurface soil, and groundwater	Surface soil, subsurface soil, and groundwater samples were collected south (downslope) of the mound and berm identified during the site visit to determine if potential site-specific chemicals have impacted site media. A residuum monitoring well was also installed to determine local groundwater flow direction and location-specific geology.

Table 3-2

Soil Sample Designations and Analytical Parameters
Range, Choccolocco Corridor, Parcel 143Q
Fort McClellan, Calhoun County, Alabama

Sample Location	Sample Designation	Sample Depth (ft)	QA/QC Samples		Analytical Parameters
			Field Duplicates	MS/MSD	
HR-143Q-GP01	HR-143Q-GP01-SS-QH0001-REG	0-1			Metals and Explosives
	HR-143Q-GP01-DS-QH0002-REG	3-4			
HR-143Q-GP02	HR-143Q-GP02-SS-QH0003-REG	0-1			Metals and Explosives
	HR-143Q-GP02-DS-QH0004-REG	3-4			
HR-143Q-GP03	HR-143Q-GP03-SS-QH0005-REG	0-1			Metals and Explosives
	HR-143Q-GP03-DS-QH0006-REG	3-4			
HR-143Q-GP04	HR-143Q-GP04-SS-QH0007-REG	0-1	HR-143Q-GP04-SS-QH0008-FD		Metals, VOCs, SVOCs, Pesticides, Herbicides, and Explosives
HR-143Q-GP05	HR-143Q-GP05-SS-QH0009-REG	0-1			Metals and Explosives
HR-143Q-GP06	HR-143Q-GP06-SS-QH0010-REG	0-1			Metals and Explosives
HR-143Q-GP07	HR-143Q-GP07-SS-QH0011-REG	0-1			Metals and Explosives
	HR-143Q-GP07-DS-QH0012-REG	3-3.5			
HR-143Q-GP08	HR-143Q-GP08-SS-QH0013-REG	0-1			Metals and Explosives
	HR-143Q-GP08-DS-QH0014-REG	3-4			
HR-143Q-GP09	HR-143Q-GP09-SS-QH0015-REG	0-1			Metals and Explosives
	HR-143Q-GP09-DS-QH0016-REG	3-4			
HR-143Q-MW01	HR-143Q-MW01-SS-QH0017-REG	0-1			Metals and Explosives
	HR-143Q-MW01-DS-QH0018-REG	3-4			
HR-143Q-MW02	HR-143Q-MW02-SS-QH0019-REG	0-1	HR-143Q-MW02-SS-QH0020-FD		Metals and Explosives
	HR-143Q-MW02-DS-QH0021-REG	3-4		HR-143Q-MW02-SS-QH0021-MS/MSD	

FD - Field duplicate.
MS/MSD - Matrix spike/matrix spike duplicate.
QA/QC - Quality assurance/quality control.
REG - Field sample.
SVOC - Semivolatile organic compound.
VOC - Volatile organic compound.

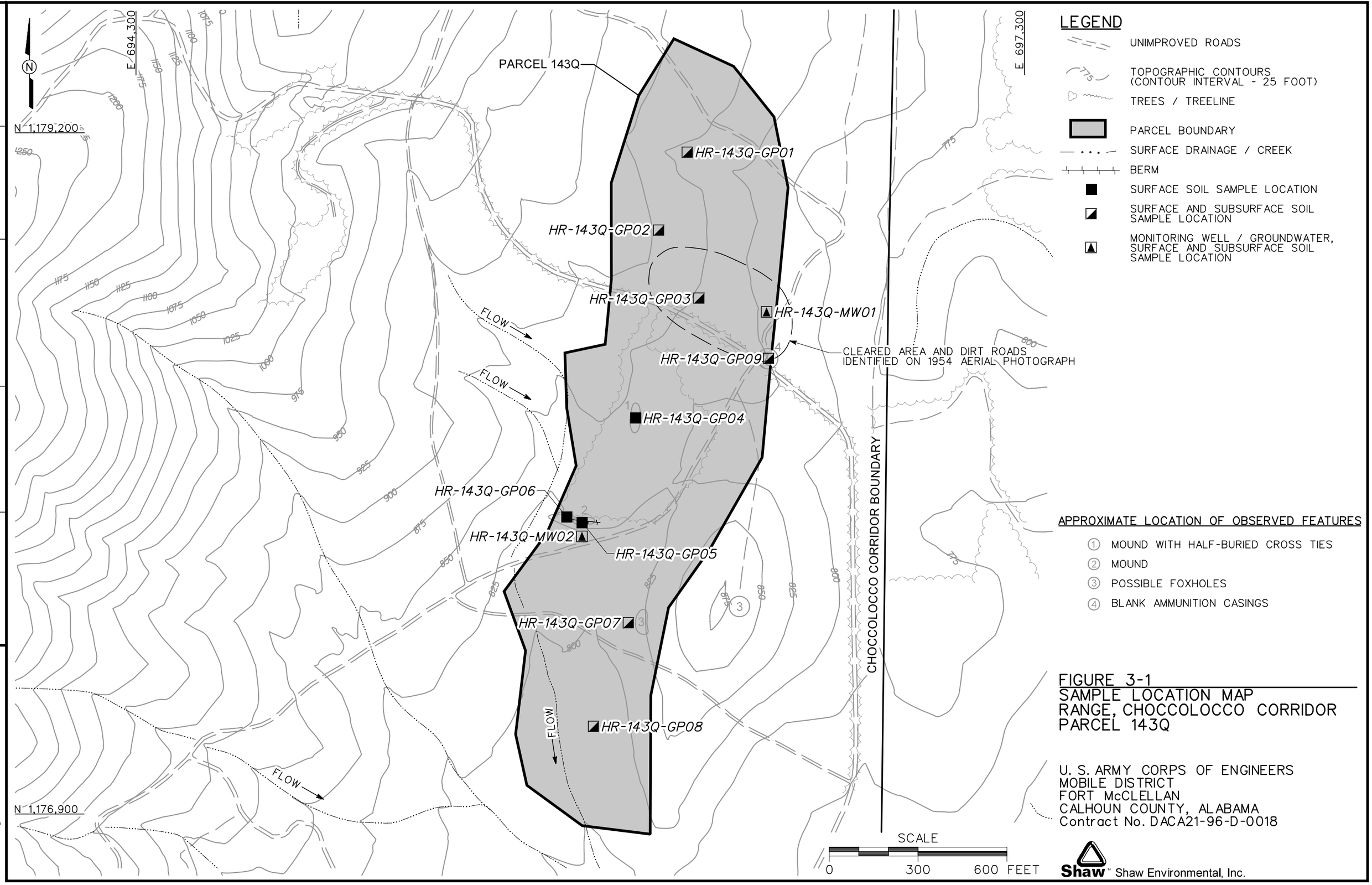

FIGURE 3-1
SAMPLE LOCATION MAP
RANGE, CHOCCOLOCCO CORRIDOR
PARCEL 143Q

U. S. ARMY CORPS OF ENGINEERS
MOBILE DISTRICT
FORT McCLELLAN
CALHOUN COUNTY, ALABAMA
Contract No. DACA21-96-D-0018

Shaw™ Shaw Environmental, Inc.

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then transferred to a clean stainless-steel bowl, homogenized, and placed in the appropriate sample containers. Sample collection logs are included in Appendix A. The samples were analyzed for the parameters listed in Table 3-2 using methods outlined in Section 3.4.

3.2.2 Subsurface Soil Sampling

Subsurface soil samples were collected from 8 soil borings at Parcel 143Q, as shown on Figure 3-1. Subsurface soil sampling locations and rationale are presented in Table 3-1. Sample designations, depths, and analytical parameters are listed in Table 3-2. Soil boring locations were determined in the field by the on-site geologist based on UXO avoidance activities, sampling rationale, presence of surface structures, and site topography.

Sample Collection. Subsurface soil samples were collected from soil borings at depths greater than one foot below ground surface (bgs) in the unsaturated zone. The soil borings were advanced and soil samples collected using a stainless-steel hand auger, following procedures specified in the SAP. Sample collection logs are included in Appendix A. The samples were analyzed for the parameters listed in Table 3-2 using methods outlined in Section 3.4.

Subsurface soil samples were collected continuously to 4 feet bgs or until hand-auger refusal was encountered. Samples were field screened using a PID to measure volatile organic vapors. The sample displaying the highest reading was selected and sent to the laboratory for analysis; however, at those locations where PID readings were below background, the deepest sample interval was submitted for analysis. The soil was then transferred to a clean stainless-steel bowl, homogenized, and placed in the appropriate sample containers. The on-site geologist constructed a detailed boring log for each soil boring. The boring logs are included in Appendix B.

3.2.3 Monitoring Well Installation

Two permanent monitoring wells were installed at Parcel 143Q to collect groundwater samples for laboratory analysis. The well locations are shown on Figure 3-1. Table 3-3 summarizes construction details of the monitoring wells installed at the site. The well construction logs are included in Appendix B.

Shaw contracted Miller Drilling Company to install the permanent wells using a hollow-stem auger drill rig at two of the hand-auger soil boring locations (HR-143Q-MW01 and HR-143Q-MW02). The wells were installed following procedures outlined in the SAP. The borehole at each well location was advanced with a 4¼-inch inside diameter (ID) hollow-stem auger from

Table 3-3

Monitoring Well Construction Summary
Range, Choccolocco Corridor, Parcel 143Q
Fort McClellan, Calhoun County, Alabama

Well Location	Northing	Easting	Ground Elevation (ft amsl)	TOC Elevation (ft amsl)	Well Depth (ft bgs)	Screen Length (ft)	Screen Interval (ft bgs)	Well Material
HR-143Q-MW01	1178589.85	696433.77	825.98	827.98	58	20	38 - 58	2" ID Sch. 40 PVC
HR-143Q-MW02	1177855.88	695810.44	825.14	827.22	40	15	25 - 40	2" ID Sch. 40 PVC

Permanent wells installed using hollow-stem auger.

Horizontal coordinates referenced to the U.S. State Plane Coordinate System, Alabama East Zone, North American Datum of 1983.
Elevations referenced to the North American Vertical Datum of 1988.

2" ID Sch. 40 PVC - 2-inch inside diameter, Schedule 40, polyvinyl chloride.
amsl - Above mean sea level.
bgs - Below ground surface.
ft - Feet

ground surface to the first groundwater-bearing zone in residuum at the well location. Beginning at the completion depth of the hand-auger boring, a 2-foot-long, 2-inch ID carbon steel split-spoon sampler was driven at 5-foot intervals to collect residuum for observing and describing lithology. The samples were logged to determine lithologic changes and the approximate depth of groundwater encountered during drilling. This information was used to determine the optimal placement of the monitoring well screen interval and to provide site-specific geological and hydrogeological information. Soil characteristics were described using the "Burmeister Identification System" described in Hunt (1986) and the Unified Soil Classification System as outlined in the American Society for Testing and Materials (ASTM) Method D 2488 (ASTM, 2000). The boring logs are included in Appendix B.

Upon reaching the target depth in each borehole, a 15- or 20-foot length of 2-inch ID, 0.010-inch continuous slot, Schedule 40 polyvinyl chloride (PVC) screen with a PVC end cap was placed through the auger to the bottom of the borehole. The screen and end cap were attached to 2-inch ID, flush-threaded Schedule 40 PVC riser. A filter pack consisting of Number 1 filter sand (environmentally safe, clean fine sand, sieve size 20 to 40) was tremied around the well screen to approximately 5 feet above the top of the well screen as the augers were removed. A bentonite seal, consisting of approximately 3 feet of bentonite pellets, was placed immediately on top of the filter pack and hydrated with potable water. The bentonite seal placement and hydration followed procedures in the SAP. Bentonite-cement grout was tremied into the remaining annular space of the well from the top of the bentonite seal to ground surface. A well cap was placed on the PVC well riser. A locking protective steel casing was placed over the PVC well riser and a concrete pad was constructed around the wellhead.

The monitoring wells were developed by surging and pumping with a submersible pump in accordance with methodology outlined in the SAP. The submersible pump used for well development was moved in an up-and-down fashion to encourage any residual well installation materials to enter the well. These materials were then pumped out of the well to re-establish the natural hydraulic flow conditions. Development continued for 8 hours or until the well was pumped dry and allowed to recharge three successive times. At monitoring well HR-143Q-MW01, a bailer was also used during development because the well was pumped dry. The well development logs are included in Appendix C.

3.2.4 Water Level Measurements

The depth to groundwater was measured in the permanent wells at the site and in wells at adjacent parcels on October 18, 2002, following procedures outlined in the SAP. Depth to groundwater was measured with an electronic water-level meter. The meter probe and cable were cleaned before use at each well following decontamination methodology presented in the SAP. Measurements were referenced to the top of the PVC well casing, as summarized in Table 3-4.

3.2.5 Groundwater Sampling

Groundwater samples were collected from both of the monitoring wells installed at Parcel 143Q. The well/groundwater sample locations are shown on Figure 3-1. The groundwater sampling locations and rationale are listed in Table 3-1. The groundwater sample designations and analytical parameters are listed in Table 3-5.

Sample Collection. The groundwater samples were collected using a bladder pump equipped with Teflon™ tubing, following procedures outlined in the SAP. Groundwater was sampled after purging a minimum of three well volumes and after field parameters (temperature, pH, dissolved oxygen, specific conductivity, oxidation-reduction potential, and turbidity) stabilized. Field parameters were measured using a calibrated water-quality meter. Field parameter readings are summarized in Table 3-6. Sample collection logs are included in Appendix A. The samples were analyzed for the parameters listed in Table 3-5 using methods outlined in Section 3.4.

3.3 Surveying of Sample Locations

Sample locations were surveyed using global positioning system and conventional civil survey techniques described in the SAP. Horizontal coordinates were referenced to the U.S. State Plane Coordinate System, Alabama East Zone, North American Datum of 1983. Elevations were referenced to the North American Vertical Datum of 1988. Horizontal coordinates and elevations are included in Appendix D.

3.4 Analytical Program

Samples collected during the SI were analyzed for various chemical parameters based on potential site-specific chemicals and on EPA, ADEM, FTMC, and USACE requirements. Samples collected at Parcel 143Q were analyzed for the following parameters using EPA SW-846 methods, including Update III methods where applicable:

Table 3-4

Groundwater Elevations
Range, Choccolocco Corridor, Parcel 143Q and Vincinity
Fort McClellan, Calhoun County, Alabama

Well Location	Date	Depth to Water (ft BTOC)	Top of Casing Elevation (ft amsl)	Ground Elevation (ft amsl)	Groundwater Elevation (ft amsl)
HR-143Q-MW01	18-Oct-02	35.69	827.98	825.98	792.29
HR-143Q-MW02	18-Oct-02	28.02	827.22	825.14	799.20
Wells at Adjacent Parcels					
HR-94Q-MW01	18-Oct-02	23.48	904.66	904.73	881.18
HR-94Q-MW02	18-Oct-02	16.37	793.11	791.11	776.74
HR-95Q-MW01	18-Oct-02	29.45	840.20	838.16	810.75
HR-95Q-MW02	18-Oct-02	14.49	815.27	813.20	800.78
HR-95Q-MW03	18-Oct-02	19.91	785.74	783.86	765.83
HR-131Q-MW01	18-Oct-02	53.62	770.92	768.90	717.30
HR-96Q-MW01	18-Oct-02	29.73	837.07	834.96	807.34
HR-145Q-MW01	18-Oct-02	21.70	814.49	812.44	792.79
HR-145Q-MW02	18-Oct-02	10.96	764.11	761.98	753.15
HR-148Q-MW01	18-Oct-02	24.70	830.94	828.88	806.24
HR-144Q-MW01	18-Oct-02	NA	903.99	901.94	NA
HR-146Q-MW01	18-Oct-02	11.49	826.46	826.20	814.97
HR-146Q-MW02	18-Oct-02	23.69	828.17	825.86	804.48
HR-147Q-MW01	18-Oct-02	67.25	842.95	840.87	775.70
HR-147Q-MW02	18-Oct-02	29.36	804.02	801.93	774.66

Elevations referenced to the North American Vertical Datum of 1988.

amsl - Above mean sea level.
BTOC - Below top of casing.
ft - Feet.
NA - Not avaliable; well was dry.

Table 3-5

Groundwater Sample Designations and Analytical Parameters
Range, Choccolocco Corridor, Parcel 143Q
Fort McClellan, Calhoun County, Alabama

Sample Location	Sample Designation	QA/QC Samples		Analytical Parameters
		Field Duplicates	MS/MSD	
HR-143Q-MW01	HR-143Q-MW01-GW-QH3001-REG	HR-143Q-MW01-GW-QH3003-FD		Metals and Explosives
HR-143Q-MW02	HR-143Q-MW02-GW-QH3002-REG		HR-143Q-MW02-GW-QH3002-MS/MSD	Metals, VOCs, SVOCs, Pesticides, Herbicides, and Explosives.

FD - Field duplicate.
MS/MSD - Matrix spike/matrix spike duplicate.
QA/QC - Quality assurance/quality control.
REG - Field sample.
SVOC - Semivolatile organic compound.
VOC - Volatile organic compound.

Table 3-6

Groundwater Field Parameters
Range, Choccolocco Corridor, Parcel 143Q
Fort McClellan, Calhoun County, Alabama

Sample Location	Sample Date	Specific Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	ORP (mV)	Temperature (°C)	Turbidity (NTU)	pH (SU)
HR-143Q-MW01	11-Sep-02	0.033	7.10	272	37.7[a]	31	5.38
HR-143Q-MW02	26-Aug-02	0.035	4.58	192	22.1	53	5.53

[a] Temperature reading may be artificially elevated due to exposure of flow-through cell to direct sunlight during parameter monitoring.

°C - Degrees Celsius.
mg/L - Milligrams per liter.
mS/cm - Millisiemens per centimeter.
mV - Millivolts.
NTU - Nephelometric turbidity units.
ORP - Oxidation-reduction potential.
SU - Standard units.

- Target analyte list metals – EPA Methods 6010B/7470A/7471A
- Nitroaromatic/nitramine explosives – EPA Method 8330.

Approximately ten percent of the soil samples and 50 percent of the groundwater samples were analyzed for the following additional parameters:

- Target compound list (TCL) VOCs – EPA Method 8260B
- TCL semivolatile organic compounds (SVOC) – EPA Method 8270C
- Chlorinated herbicides – EPA Method 8151A
- Chlorinated pesticides – EPA Method 8081A
- Organophosphorous pesticides – EPA Method 8141A.

3.5 Sample Preservation, Packaging, and Shipping

Sample preservation, packaging, and shipping followed requirements specified in the SAP. Sample containers, sample volumes, preservatives, and holding times for the analyses required in this SI are listed in the SAP. Sample documentation and chain-of-custody records were completed as specified in the SAP.

Completed analysis request and chain-of-custody records (Appendix A) were included with each shipment of sample coolers to EMAX Laboratories, Inc. in Torrance, California.

3.6 Investigation-Derived Waste Management and Disposal

Investigation-derived waste (IDW) was managed and disposed as outlined in the SAP. The IDW generated during the SI at Parcel 143Q was segregated as follows:

- Drill cuttings
- Purge water from well development, sampling activities, and decontamination fluids
- Spent well materials and personal protective equipment.

Solid IDW was staged on site in lined roll-off bins prior to waste characterization and final disposal. Solid IDW was characterized using toxicity characteristic leaching procedure analysis. Based on the results, drill cuttings, spent well materials, and personal protective equipment generated during the SI were disposed as nonhazardous waste at the Three Corners Landfill located in Piedmont, Alabama.

Liquid IDW was staged on site pending the results of waste characterization. Liquid IDW was characterized by VOC, SVOC, and metals analyses. Based on the analyses, liquid IDW was discharged as nonhazardous waste to the FTMC wastewater treatment plant on the Main Post.

3.7 Variances/Nonconformances

No variances or nonconformances to the SFSP were recorded during completion of the SI at Parcel 143Q.

3.8 Data Quality

The field sample analytical data are presented in tabular form in Appendix E. The field samples were collected, documented, handled, analyzed, and reported in a manner consistent with the SI work plan, the FTMC SAP and quality assurance plan, and standard, accepted methods and procedures. Data were reported and evaluated in accordance with Corps of Engineers South Atlantic Savannah Level B criteria (USACE, 2001b) and the stipulated requirements for the generation of definitive data presented in the SAP. Chemical data were reported by the laboratory via hard-copy data packages using Contract Laboratory Program-like forms.

Data Validation. The reported analytical data were validated in accordance with EPA National Functional Guidelines by Level III criteria. The data validation results are summarized in a quality assurance report, which includes the data validation summary report (Appendix F). Selected results were qualified based on the implementation of accepted data validation procedures and practices. These qualified parameters are highlighted in the report. The validation-assigned qualifiers were added to the FTMC ShawView™ database for tracking and reporting. The qualified data were used in comparisons to the SSSLs and ESVs. Rejected data (assigned an "R" qualifier) were not used in the comparisons to the SSSLs and ESVs. The data presented in this report, except where qualified, meet the principle data quality objective for this SI.